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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/753,947	01/07/2004	Stephen B. Siegel	6987-90135	5528
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WELSH & KATZ, LTD 120 S RIVERSIDE PLAZA 22ND FLOOR CHICAGO, IL 60606			PADGETT, MARIANNE L	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 02/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/753,947

Applicant(s)

SIEGEL, STEPHEN B.

Examiner

Marianne L. Padgett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 June 2004.
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-39 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

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1). The preliminary amendment of 6/29/04 is noted by the examiner. The scanned file does not indicate that a non-compliant notice was ever sent out; but the examiner notes that claim 39 is on the same page as the remarks, hence is NON-Compliant (results in claim 39 not being with the current listing of the claims in the scanned file). Please correct this in the future to avoid problems.

2). Claims 1-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Use of acronyms or abbreviations in the claims without first writing them out in full at the first use in a claim sequence is improper due to the uncertainty it can cause due to multiple possible meanings, etc. In all independent claims, see "LED" which may mean "light emitting device" or "...diode", etc.

It is noted that ultraviolet light (UV) is defined as being between 100-400 nm or 40-400 nm, and visible light is from 400-700 or 400-760nm, hence applicant's claims 1 and 16 appear to be claiming UV LED's that emit visible (violet) light, which is contradictory. Do the claimed UV LED assemblies emit more than just UV light, i.e. multiple wavelengths not all UV, or is the terminology a misnomer? Also see claims 6 and 21 that explicitly say UV LED's emit visible light. Clarification is desirable.

Claim 10 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 10 is dependant on itself, which is improper. Given the

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subject matter; apparent intended antecedence, order of listing, and analogous claims 24-25, for purpose of examination over art, the examiner will consider probable dependence from claim 9.

Claims 11 and 26, contain the limitations of “at least 50% of the power output for UV-LED assemblies according to a viewing cone angle of $2\theta_{1/2}$ ”. This has no clear meaning to the examiner. Repeat of this language with out explanation was found on pages 2 and 8. Whatever θ is, appears to be undefined. No Figure to explain intended geometry was found, and what does the power output mean? Are the LED’s not outputting their full potential, or is 50% or less of the light going some place other than the claimed uniform pattern of light, or what? Lacking clarity, definition or understanding of intent, meaningful examination over art is not possible.

Use of relative terms that lack clear metes and bounds in the claims, or in provided definitions in the specification or cited prior art, is vague and indefinite. In claims 12 and 27, lines 3 “higher light density” than what? Also “large” is a relative term, which appears to be intended to possibly be defined by the phrase in parenthesis, but this is not clearly or positively done. As written, it could also be considered a narrower secondary range, such that the first was an undefined relative one.

Quotation marks have previously been used to indicate amendments, and the examiner is uncertain how their presence in the claims (or specification, as on p.2) will be treated if this case goes to the printers, hence use of some other means to set a phrase apart is recommended. Also undefined jargon or slang should not be used in the claims. See “current hogging”.

It is noted that some of the apparatus claims are written as method limitations or actions that do not add any clear claimed structure to the apparatus. See claims 19 and 29-30, and to a lesser extent claim 20 (placed? Is it a part of or not?).

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2). The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim*** rejected under 35 U.S.C. 102(***) as being *** by ***.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3). Claims 1-2, 4, 12, 14, 16-17, 19, 27 and 29-30 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2, 6, 10, 21-22, 26 and 28 of copending Application No. 10/386,980. Although the conflicting claims are not identical, they are not patentably distinct from each other because while over all configuration and motions of LED assemblies on panels is essentially the same,

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this (947) application requires use of a different, but overlapping set of wavelengths in the row of LEDs. The (980) patent application specifies use of 2 or more wavelengths selected from the specific values of 390 nm, 350 nm, 370 nm, 415 nm and 420 nm, while this application (947) may select any between the range of 180-420 nm or between 315-400 nm, which are inclusive of or encompass all or most of the specific alternative values of the (980) application. It would have been obvious to one of ordinary skill in the art that these overlapping ranges or grouping of wavelengths constitute obvious variations, with the specific λ of (980) being totally encompassed by the instant case's range, thus the (980) independent claims that are generic with respect to wavelength employed, also encompass the specific range of this application's independent claims listed above.

Also, note with respect to apparatus claims 29-30 of this case (947), these are phrased as method limitations for effects of photoinitiators in compositions that might be irradiated in the apparatus, however the wavelengths recited therein do not necessarily come from LED's claimed apparatus and provide no necessary structure to the apparatus, hence as written these claims are not distinguished from those of the (980) application. It is noted that (980)'s discussion of "flip chip" (claims 10 or 26) suggest at may be what is described in the present claims 12 and 27 as large chips, which is relative.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

4). Claims 1, 5, 16, 20 & 34-39 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 7-11, 19-21,

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27-31, 40-47 and 50-52 of copending Application No. 10/339,264 in view of Young (6,561,640) or Biegelsen et al (6,536,889), both discussed below.

While the limitations are claimed in different orders, the cases are describing the apparatus and curing methods using analogous LED arrays. Application (264) differs by not requiring the range of 180-420 nm for the UV-LED or having different wavelengths, the present case covers most of the UV spectra and use otherwise like arrays or rows. In the first claim in the (264) case, the use of multiple rows on a panel encompasses the minimal recited feature of a row on a panel. The various movement limitations of the two cases overlap, and are considered different variations, with the (264) case claiming some narrower configurations, such as vertical movement, or that when objects are moved past the arrays they are on a web, but these configurations are conventional assembly line features, encompassed by the broader claims, hence constitute obvious variations thereon. Similarly the inert gas use of the present claims overlaps with the “non-oxygen gas” and He limitation of (264) as well as “lighter” or heavier” than air depending on which inert gas (Ar or He, etc). With respect to different wavelengths, either Young or Biegelsen et al, detailed below, provide examples of multiple λ use in LED arrays, and provide the advantage of enabling selective curing or staggered curing, thus providing motivation to incorporate this use of different wavelengths in (264).

Note that claims 7 and 27 of (264) are included, since as light travels it would have been at some time at claimed distances.

Present broad claim 34, which broadly includes any means of operatively maintaining control of UV intensity, reads on claims 17, 37 and 42 of (264), since the means of controlling movement controls intensity in an operative manner. For the apparatus, if the means is capable

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of any intensity control, it will read on the claimed system, whether or not it is ever used for such a purpose.

This is a provisional obviousness-type double patenting rejection.

5). Claim 34 is rejected under 35 U.S.C. 102((b) or (e)) as being clearly anticipated by Young or Biegelsen et al or Dowling et al.

6). Claims 1-6, 11-21, 26-30 and 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young (6,561,640 B1) or Biegelsen et al (6,536,889 B1), optionally in view of Dowling et al (2002/0074559 A1), except for claim 6 & 21.

In Young, see the abstract; figures; col. 2, lines 29-65; col. 3, lines 45-col. 4, line 65; col. 5, lines 60- col. 6, line 63; col. 7 lines 8-67⁺; col. 8, line 44-col. 9, line 15; and claims, especially 1, 13-14 and 17-22. Note col. 4, lines 24-31 discuss LEDs and control of UV intensities.

Young teaches UV curing where UV curable substances (such as 4 or more colors of ink, each with different photoinitiators and cured by different wavelength ranges) are first partially cured, and then completely cured. The sequential cure is preformed by moving the substrate relative to spaced apart curing stations, which may employ UV light emitting devices that may be arrays of diodes, with different wavelengths suggested for the selective cure of the different substances deposited (inks), where the UV emitting devices may additionally include UV lamps.

Young does not teach any particular pattern for their array of multiple wavelengths, nor any specific wavelengths, but the wavelengths employed are taught to be chosen according to that needed to cured the particular substances being treated, therefore it would have been obvious to one of ordinary skill in the art that the taught use of multiple UV wavelengths would have included those as claimed when the particular inks and photoinitiators employed were sensitive

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to the claimed wavelengths. Note as applicant's claims are generic to any curable ink, coating or adhesive, with no particular sensitivity, the claimed wavelengths of 365 and 385 nm have no specific significance in and of themselves for generic curing technique (apparatus). As noted, Young teaches the use of LED's capable of separate emission of different wavelengths, and of arrays. They further teach properly selecting operating parameters to control the effectiveness of the curing, by manipulating power, intensity, direction, etc (col. 7, esp. lines 15-22), hence it would have been obvious to one of ordinary skill to arrange their multiple wavelengths to effectively distribute the light from the individual diodes in the array, in order to achieve the taught curing. As array are typically composed of rows, and as even distribution is commonly achieved by alternating the objects that emit what is being distributed at a sufficient distance, i.e. the different wavelength emitting diodes, alternation by row or by place in a row or a combination thereof, would have been an obvious and standard means of achieving the teachings by evenly physically dispersing the sources of the wavelengths. Staggering of the positions of the diodes in successive rows would further the even distribution of light, by further reducing clustering or grouping of like emissions. While Young does not discuss in what atmosphere their deposition and curing operations are preformed, this would depend on the nature of the specific polymer being cured, thus ones where effective curing would be inhibited by oxygen, as is old and well know in the polymer (ink) curing art, would have been obvious to cure an inert gas, as this is a conventional means of overcoming oxygen inhibition.

Alternately, Biegelsen teach deposition of plural materials, each with 2 photoinitiators that induce curing at different wavelengths, with teachings of successively curing at those wavelengths. UV curing sources are taught to include arrays of LEDs, and the substrate is

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moved relative to the applicator and light subsystems. See the abstract; figures, esp. 4; col. 2, lines 30-63; col. 3, lines 20-29; col. 4, lines 10-37+; col. 5, line 1- col. 6, line 49; col. 9, line 24- col. 10, line 15; and col. 8, lines 1-13 is noted to teach 1 or more arrays of separate light sources, which are provided with the ability to manipulate intensity of emitted light.

While Biegelsen et al do not teach any specific arrangement for their arrays of diodes and plural wavelengths, successively applied, it would have been obvious to one of ordinary skill in the art that in order to achieve the taught successive treatments in Figure 4, described on col. 9-10, when using a diode array, that rows of diodes with the successively applied wavelengths would have been an effective and practical way of achieving the taught steps, analogously to the above discussion.

Also, while no specific UV wavelengths or atmospheres are taught, arguments as applied above to Young, would again have been equally appropriate in Biegelsen et al. Both Biegelsen et al and Young teach use of LED arrays, and illustrate their use as subsystem, which are independently mounted and mobile, but while showing a box for the subsystem in their figures, they do not discuss any general features therefore. However, it would have been obvious to one of ordinary skill to contain LED array subsystems in standard protective enclosures (suggested generally by a box), which would have expected to have a window transparent to the light being emitted in order to function as taught, and to either be cleaned, replaced or removed for cleaning periodically as part of standard competent maintenance procedures.

Young or Biegelsen et al both teach use of arrays of UV-light emitting devices (LED) to cure deposition of multiple inks containing multiply photoinitiators, where plural wavelengths are employed to effect different photoinitiators when curing inks with UV photosensitive resins.

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Both primary references illustrate deposition of coating (ink) onto a substrate moving relative to the coating and curing stations. As discussed above, Young or Biegelsen et al, both employ multiple wavelengths to cure deposit(s) on a substrate, all at the same curing station, one of ordinary skill and competence would have recognized that the sources of different λ need to be evenly distributed across the array for uniform curing to occurred, since it is an old and well known characteristic of light that its intensity, hence its ability to effect curing is related to distance. As for particular UV wavelengths for curing, the primary references teach choosing them depending on choice of resins and their photoinitiators, but provide no specific suggestions, hence any wavelength known to be useful for UV curing and available from LED would have been expected to have been effective in these teaching as set forth above. However, Dowling et al teach an LED device with a row of LED's that may be inclusive of wavelength of 395, 420, or 300 to 370 nm [0037], where the device of Dowling may be used as a curing system for inks, cements, enamels, epoxies (i.e. adhesives) or any other material that may cure under UV radiation therefore, thus optionally, it would have been further obvious to one of ordinary skill in the art to use wavelengths as claimed in arrays inclusive of rows arranged as claimed in the Young or Biegelsen et al teachings, as Dowling indicates the usefulness of the claimed λ , inclusive for curing and in rows. As illustrated in Figure 1, the device of Dowling et al may be a row, i.e. an array of LED's on a panel connected to a controller, as disclosed in [0020-21], [0025-27], [0048, 50, 53] and [0084]. The device may be hand held, thus is also consistent with providing relative movement between light and object, and may have plural UV wavelengths. [0064 and 0082] explicitly teach usefulness in curing operations, thus suggesting use therefore. In Dowling et al, see the abstract; figures 1, 3, 4; [0020-21]; [0025-27]; [0039-40] for

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wavelengths of 395, 420, 300 and 370 nm; [0042]; [0048-50]; [0052-53]; [0064]; [0071]; [0082]; & [0084], noting that controller (108) is discussed in [0048, 50], and [0053] teaches adjustment of output levels, which is equivalent to intensity.

Dowling et al teach that their LED device may be stand alone or be used in combination with other UV sources [0040] and [0050]. While they do not specifically teach that other source is a lamp, in the background [0007], UV lamps are shown to be old and well known sources for taught uses, such as purification, hence qualify for the teaching of combined with other UV source, thus are obvious as suggested

7). Claims 7-10, 22-25 and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Young or Biegelsen et al, in view of Dowling et al (optional) as applied to claims 1-6, 11-21, 26-30 and 35-39 above, and further in view of Ostler et al (2001/0046652 A1) or Contois et al (4,980,701 A) or Kennedy et al (5,634,711 A).

The claim require one or more of various options for cooling LED assemblies, but the references of above combination do not discuss the structure of the assemblies mechanisms, hence whether or not cooling is employed. However, cooling of radiation sources, inclusive of diodes or LED is old and well known in the art as illustrated by Kennedy et al (see the abstract; Fig. 1-2 & 7; col. 3, lines 38-59; col. 4, lines 11-20 and claims 5-8, etc), who teach use of LEDs for photocuring where heat sinks (26) and fans are employed to control temperature of the substrate and array; or by Contois et al, who discuss the need to reduce thermal effects in an LED printhead, exemplified by air cooling and/or spacing (abstract; figures, summary; col. 3; col. 4, lines 61-col. 5, line 26, esp. lines 15-20); or as illustrated by Ostler et al, who discuss LED array design, with use of heat sinks (1718) or (2605), and use of fans (2601) to move air that

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conducts the heat away from the sinks (abstract; figures; [0060, 62, 64, 67] and [0069-70]).

Therefore, it would have been obvious to one of ordinary skill to employ known protective measure against heat or thermal damage, when using LED arrays as taught in the above combination in order control thermal effects as is taught and known to be desirable as described in these ternary references.

8). Claims 1, 6, 14, 16, 21, 29 & 34-39 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-6, 8-10, 13-18, 20, 22 of copending Application No. 10/789,020. Although the conflicting claims are not identical, they are not patentably distinct from each other, because these two sets of claims mix orders and have overlapping scopes of printing/coating with inks or coating or adhesives, movements of both LED curing arrays and products in obvious variations on a like theme. For example, the present case has some independent claims limited to 180-420 nm for the UV-LED, others just to UV-LED's in general, while (020) always claims the broader range. This case my treat inks, coating or adhesives, while (020) only deals with printed inks, thus encompasses it.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

9). Other art of interest includes Jin et al (2002/0016378 A) or Ollett et al (2004/00907964 A1) or Bhat et al (2001/003985 A1) of interest for their discussion of LED arrays.


10). Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on Monday-Friday from about 8:30 AM to 4:30 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Beck Shrive can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Padgett/LR
February 7, 2005
February 16, 2005



MARIANNE PADGETT
PRIMARY EXAMINER